

## EFFECTS OF PREGNANCY ON THE ARMY PHYSICAL FITNESS TEST

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## ABSTRACT

The purpose of this study was to determine the actual and perceived amount of time needed for the postpartum soldier to return to pre-pregnancy fitness condition as evidenced by APFT scores before and after pregnancy. There were three questions addressed in this study. First, what effect does pregnancy have on physical fitness levels as demonstrated by APFT scores? Second, how long does it take the postpartum soldier to return to pre-pregnancy fitness condition as measured by six month and one year postpartum APFT scores? And third, how long do the soldiers think it will take for them to return to pre-pregnancy fitness condition and perform as they previously did on the APFT? The findings from this study have implications for the education of healthcare providers, patients, and the Army regarding the effects pregnancy and delivery have on the human body, as well as enlightening them on the actual and perceived time needed for postpartum recovery and return to pre-pregnancy fitness condition. Using a quantitative descriptive design, data was gathered using a questionnaire asking demographic data, pregnancy information, exercise routines and beliefs, and APFT scores. Results revealed that complications, weight gain, and postpartum exercise practices had statistically significant effects on postpartum APFT scores. There were statistically significant differences between the pre-pregnancy and first post-pregnancy APFT scores as well. The percentage of women able to score equal or better on the first postpartum APFT compared to the pre-pregnancy APFT was 19%. The percentage of women able to do so on the second APFT was 31%. Seventeen percent of participants believed six months was enough time to return to pre-pregnancy physical condition. The

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## CHAPTER ONE

### Introduction

Returning to a pre-pregnancy exercise regimen and previous fitness level can be difficult. It is a common concern heard by clinicians from their patients. Returning to pre-pregnancy physical condition is especially important for Army personnel. Twice a year Army soldiers around the world are required to perform the Army Physical Fitness Test (APFT). It is a standardized test used Army-wide to measure the fitness level of a soldier. This 300 point test is composed of three timed segments, each worth 100 points: a) a two mile run b) a two minute push-up portion and c) a two minute sit-up portion (FM 21-20, 1999). A soldier's score is determined using a standardized table that compares the soldier's age and sex to the running time in minutes and the number of completed sit-ups and push-ups.

### Link to Healthcare

Historically, six-months for postpartum recovery has been the standard prescription by clinicians per Army regulation (Department of Defense, 1995). It is the responsibility of these same clinicians to encourage a change in the Army pregnancy profile regulation by knowing the physiological effects of pregnancy. For years the healthcare community has listened to the complaints about failing or no longer earning maximum points on the APFT after delivery. This can have a negative impact upon careers, resulting in denial to key schools or being passed over for promotion. Failing the APFT results in clinicians and leaders now having to deal with patient wellness issues created by this new added stressor to the soldier's life.

Healthcare professionals in the both the Army and civilian communities know the effects that pregnancy and delivery have on the human body. However, healthcare professionals are required to sign a standard six-month pregnancy profile regardless of the patient receiving an episiotomy, c-section, history of strict bedrest for preterm labor, pre-eclampsia, or postpartum depression (Department of Defense, 1995). By utilizing the six-month pregnancy profile, this suggests that six months is enough time in postpartum to return to pre-pregnancy fitness condition. This leads to the major research question of this paper, is six months enough time to return to pre-pregnancy fitness level? There seems to be a gap in understanding the amount of time needed to return to pre-pregnancy fitness levels as defined by Army PT standards. This study aimed to describe the amount of time truly needed for postpartum recovery and to return to pre-pregnancy fitness condition, as well as positively impact the careers of soldiers should the regulation change as a result of this research.

This study may help educate healthcare providers, patients, and the Army on the effects pregnancy and delivery have on the human body. The study may also enlighten healthcare providers and patients on the actual time needed for postpartum recovery and return to pre-pregnancy fitness condition. The results of this study on the amount of time to return to pre-pregnancy fitness condition will hopefully lead to further research that may influence policy decisions.

#### Purpose of Research

The purpose of this study was to determine the actual and perceived amount of time needed for the postpartum soldier to return to pre-pregnancy fitness condition as evidenced by APFT scores before and after pregnancy.

## Research Questions

There were three questions guiding this study: 1. What effect does pregnancy have on physical fitness levels as demonstrated by APFT scores? 2. How long does it take the postpartum soldier to return to pre-pregnancy fitness condition as measured by six month and one year postpartum APFT scores? 3. How long do postpartum soldiers think it will take to return to their pre-pregnancy physical condition?

## Background and Significance

Physical activity and maintenance of physical fitness are essential to the health of women in their childbearing years. In the absence of obstetric or other clinical complications, most women can exercise moderately to maintain cardiorespiratory and musculoskeletal fitness throughout pregnancy (Heffernan, 2000). Increased popular emphasis on fitness and exercise is causing pregnant women to ask their health care provider about continuing exercise during the course of gestation (Kulpa, White, & Visscher, 1987). Studies have shown that exercise during pregnancy is beneficial, improving cardiovascular fitness; control of maternal weight gain; reduction of some discomforts during pregnancy, such as swelling, leg cramps, fatigue, and shortness of breath; and a positive influence on labor and delivery (Ratchliffe, Baxley, Byrd, & Sakornbut, 2001). Clinicians should be prepared to educate patients on the benefits, limitations, and dangers of exercise throughout pregnancy and in the postpartum period.

There are many physiologic changes to the female body that occur with pregnancy. These changes have an effect on pregnancy and postpartum exercise tolerance.

*Cardiovascular:* Cardiovascular adaptation throughout pregnancy influences and interacts with a woman's ability to exercise. This increase in cardiac output increases ventricular filling and myocardial contractility (Beckman, et al., 1998). Systemic vascular resistance decreases during aerobic exercise, resulting in increased cardiac output. Heart rate increases as a result of decreased vagal tone or an increase in sympathetic drive to the Sino-Atrial node (Beckman, et al, 1998). Clapp (1997) demonstrated that vascular remodeling of pregnancy begins early and persists for at least one year after delivery.

*Respiratory:* The physiologic changes in the respiratory system are extensive, including both anatomic and functional alterations. The rise of the diaphragm by approximately four centimeters, is compensated for by an increase in the transverse diameter of the chest (Mettelmark, Wiswell, and Drinkwater, 1991). During pregnancy, minute ventilation and oxygen consumption increase, resulting in increased resting oxygen requirements and work of breathing. This results in decreased amount of oxygen available for aerobic exercise.

*Musculoskeletal:* Some musculoskeletal changes during pregnancy include lumbar lordosis, widening of pelvic joints, as well as softening of cartilage. These changes can affect the ability to continue a previous exercise regimen, especially if high impact activities are involved.

*Other:* Other common changes to the body that can affect exercise are hormonal changes caused by maternal endocrine glands and gastrointestinal discomforts. Exercise tolerance during and after pregnancy are altered as a result. This is significant to the postpartum athlete who wishes to resume running or high-impact aerobics. The



physiologic changes persist for at least six weeks postpartum, causing the American College of Obstetricians and Gynecologists (ACOG) to recommend that patients resume pre-pregnancy exercise routines gradually (ACOG,1994). Most clinicians today recommend postponing vigorous, high-impact exercise for six to eight weeks postpartum.

### Variables and Proposed Relationships

The variables studied included pregnancy and its effect on the soldier's APFT scores postpartum. Pregnancy variables included were: weight gain, complications, bedrest, ability to exercise postpartum, type of delivery, exercise beliefs and practices, pregnancy exercise program. It was hypothesized that bedrest, complications, c-section, lack of exercise, and the belief that exercise is not important would all negatively impact post-pregnancy APFT scores. It was hypothesized that the six-month postpartum APFT score would be less than the pre-pregnancy APFT score, and the twelve-month postpartum APFT score would be higher than the six-month postpartum APFT score but closer to the pre-pregnancy score. It was hypothesized that those women who exercised during pregnancy and postpartum would return to their pre-pregnancy condition faster than those women who did not.

### Theoretical Framework

The theoretical framework for the study was based on the health belief model. It was initially proposed by Rosenstock in 1966 and later revised by Becker and Marman in 1975. It is a sociobehavioral compliance model that attempts to explain health behavior and/or compliance. The model proposes that an individual's subjective state of readiness to take action and engage in health related behaviors is a function of several factors. The first factor is an individual's perception of susceptibility to an illness and perceived

severity of consequences of having the illness. The second factor is the estimation of the risks weighted against the benefits of a health behavior like exercise. Some women tend to not exercise during pregnancy due to the perceived risks to the medical safety of the pregnancy. The third factor involves internal or external cues for action that are stimuli triggering appropriate health behaviors. An example of an external cue is medical advice stating that it is healthy to exercise during pregnancy, and an internal cue is the euphoria one receives with exercise.

#### Key terms

- Army Physical Fitness Test (APFT)

Conceptual Definition: Tool used Army wide to test the physical fitness of an individual by running and performing sit-ups and pushups.

Operational Definition: A standardized 300 point test used Army-wide to measure the fitness level of a soldier. It is composed of three timed segments each worth 100 points: two mile run, two minutes of push-ups, and two minutes of sit-ups.

- Exercise

Conceptual Definition: Physical work performed to promote health and wellness of human mind and body.

Operational Definition: Aerobic events lasting 30 minutes, 3 times a week, during and after pregnancy.

- Postpartum

Conceptual Definition: Childbirth, or after delivery

Operational Definition: The first six months after birth

## CHAPTER TWO

### Review of Literature

There is an abundance of information on the positive affects of exercise during and after pregnancy and how it can increase recovery to pre-pregnancy fitness levels. However, there is not a great deal of information regarding the exact amount of time it takes to return to the pre-pregnancy fitness level. Only one article was found that discussed the effects of pregnancy on the Army Physical Fitness Test scores.

Lombardi, Wilson, Peniston, (1999) was the only relevant empirical literature that sheds light on both issues of exercise during pregnancy and the affects of pregnancy on APFT scores. This study measured the effects of the wellness program at Madigan Army Medical Center for pregnant soldiers. Scores were obtained from soldiers both before and after pregnancy. Of the 181 APFT scores gathered, 113 had lower scores postpartum and 48 soldiers had higher scores. Thirty-three soldiers failed the postpartum APFT. The average number of days postpartum for women in this study was 176. This may demonstrate that soldiers need longer than 6 months to recover from pregnancy and delivery to achieve their pre-pregnancy fitness level. Results indicated that infants of the wellness group participants had proportionately increased gestational age and birth weight, with lower incidence of complications of fetal bradycardia, hyperbilirubinemia, preeclampsia, and premature labor (Lombardi, Wilson, Peniston, 1999). The most relevant finding was that women who exercised during pregnancy retained a moderate degree of fitness throughout the pregnancy and even more favorable pregnancy outcomes and fewer complications. Additionally, the researchers found that pregnancy affects the

readiness and/or duty status of the pregnant soldier for more than one year. Soldiers found themselves failing the six month postpartum APFT. This study suggested further research needs to be conducted in the area of postpartum return to fitness/physical readiness.

While there may be only one article addressing pregnancy effects on the Army Physical Fitness Test, there is an abundance of literature supporting the benefits of exercise during pregnancy. Several studies support that maternal exercise in the low-risk, conditioned woman was found to have a beneficial effect on the course and outcome. This information is useful to the clinician when prescribing exercise to the patient and reassuring her of the safety and health for her and her fetus. Clapp (1990) used an experimental design with the purpose of providing a definitive answer to the question of whether continuation of a regular exercise regimen throughout pregnancy influences the course and outcome of labor. He tested the hypothesis that when a regular running or aerobics regimen is continued at or above 50% of pre-conceptual levels throughout pregnancy then it has a negative impact on the course and outcome of labor (Clapp, 1990). Direct assessment of this relationship is difficult because of the effects of multiple exercise variables. To control the multiple variables involved, the study used a prospective design and was limited to well-conditioned recreational athletes who engaged in high-intensity exercise (either running or aerobics). The sample was composed of 67 runners and 64 aerobic dancers. All subjects had been exercising regularly for at least 6 months before conception, 3 or more times each week for at least 30 minutes each session. They were divided into two groups on the basis of their spontaneous level of exercise performance during pregnancy. Forty-six runners and 41 aerobic dancers who

continued to exercise at or above 50% pre-pregnancy performance level throughout the pregnancy formed the continued group. The 21 runners and 23 aerobic dancers who spontaneously stopped their regular exercise regimen by the end of the first trimester formed the discontinued exercise group. To quantitate each individual's exercise, oxygen consumption was measured before conception and the relationship between heart rate and oxygen consumption during graded exercise in the lab before conception and every 6-8 weeks during pregnancy. A portable telemetry system gathered data and was quantitated using the training effect method expressed as a duration-intensity index. The continuing ballistic motion associated with running and aerobics did not increase the incidence of preterm labor. The exercise group experienced a decreased incidence of episiotomies, labor stimulation, and operative deliveries. There was an increase in duration of labor time and incidence of fetal stress with the discontinued exercise group. These data negate the initial hypothesis and clearly indicate that continuing a regular exercise program during pregnancy is beneficial for the course and outcome of labor.

Kulpa, White, and Visscher, (1987) also prospectively investigated the effect on fetal and maternal outcomes of gestational exercise in a recreational athlete. This was a 2 1/2 year prospective study consisting of testing 141 low-risk pregnant participants. They were randomly assigned to control or exercise groups as primiparous or multiparous, differing only in frequency of aerobic exercise. The predicted maximum oxygen uptake values were determined using the standard Bruce treadmill protocol, 12 lead EKG monitoring, and Astrand protocol for submaximal testing on a bicycle during the first trimester and postpartum. The type of aerobic exercise performed consisted of swimming, aerobics, jogging, brisk walking, cross country skiing, stationary biking, and

playing racketball. Of the 85 women who participated in this study, all delivered at term (38-42weeks). The primigravid group in the exercise group had a shorter active phase in the second stage of labor when compared to the control group. There was no difference between the control and exercise multiparous groups. The results also showed no significant difference in the mode of delivery, gestational age at delivery, degree of laceration, fetal weight, and Apgar scores by using 2x2 analysis (Kulpa et al., 1987).

Using a time dimensional design, Hall and Kaufmann (1987) retrospectively studied the effects of physical conditioning on both quantifiable pregnancy outcomes and the subjective experience of pregnancy. The study findings demonstrated that the development of muscular strength and/or flexibility needed to support the enlarging organs of the pregnant woman and improvement of her aerobic fitness have two main effects: minimization of biomechanical changes during pregnancy and therefore lessening of prenatal discomfort and minimization of labor and delivery complications (Hall & Kaufmann, 1987). Prenatal comfort was assessed by subjective reports of the patient and included tension level, general physical comfort, and sense of well-being. Labor and delivery data included length of labor, type of delivery, length of hospital stay gestational age, birth weight, and Apgar scores. The sample consisted of 845 pregnant women who received obstetric care in private practice settings in Ocala, Florida. They were categorized into four groups, depending on the number of exercise sessions completed during pregnancy. The participants were asked to exercise 3 days a week. The warm-up consisted of five minutes on a treadmill at a rate of 3 to 4 mph or five minutes on the exercise bicycle at 300 kpm. This was followed by a detailed exercise session using exercise machines and aerobic bicycles. The sessions were prescribed by the doctor and

conducted by an exercise instructor. The data were collected from the hospital and the exercise center. Medical data included total labor time, duration of second stage of labor, incidence of cesarean section, length of hospital stay, gestational age, birth weight, and Apgar scores. At six weeks postpartum, all were surveyed regarding their subjective responses to the exercise program for self-image, reduction in pregnancy discomforts, relief of tension, and rapidity of recovery. Simple analysis of variance and Duncan's multiple range test were used to analyze data. Mean length of labor in the study groups were calculated only for primigravid women, since multigravid women have shorter total labors. The study found no significant differences in times of labor. The rate of cesarean section was 6.7% in the high-exercise group, 19% in the medium group, 23% in the low exercise group, and 28% in the control group. The birth weight of babies of the control mothers averaged 65 to 151 grams less than the three exercise groups. The mean hospital stay was longer for women in the control group than the three exercise groups. Patients who exercised until the onset of labor thought it was beneficial during and after labor and delivery.

#### Gaps in Knowledge Base

There is a lack of information and research on how long it physically takes a woman to recover from pregnancy and return to pre-pregnancy fitness level. Therefore, it is an important and relevant subject that needs to be explored to contribute to nursing's body of knowledge. There seems to be a general consensus in the literature that exercise is beneficial during pregnancy, however there is a lack of research on the exact recovery time to return to pre-pregnancy condition. This includes women who exercise during

pregnancy. This is especially relevant to the Army community due to the fitness requirements.

#### Contribution to Healthcare

The practitioners who research and publish information on exercise during and after pregnancy are limited. Those researchers that have published, have made a huge contribution to the healthcare profession by educating both clinicians and patients. It is reassuring to healthcare providers when giving evidenced based advice, stating that exercise is healthy for both mother and infant during pregnancy. It helps to guide providers when asked by the patient if they can exercise during the postpartum period as well. The literature has found that it is not only safe, but may help expedite recovery time.



## CHAPTER THREE

### Methodology

#### Research Design

This study used a quantitative descriptive survey design. The data were gathered using a questionnaire asking demographic data, pregnancy history, exercise routines and beliefs, and APFT scores.

#### Sample

According to Polit and Hungler (1995), estimating a moderate effect size of .60 with alpha at .05, a sample size of 50 would have .80 power to detect a difference between the three means using repeated measures analysis. The fifty-two Army females were recruited via convenience sampling at Dewitt Army Community Hospital and Kimbrough Ambulatory Care Center. Participants must have had at least one pregnancy while on active duty with at least one postpartum for-the-record Army Physical Fitness Test.

#### Measurement

The tool was a self-report questionnaire developed by the primary investigator. It was designed from the concepts used by Lomardi, Wilson, & Peniston (1999). The questionnaire used open-ended questions, dichotomous questions, and six 5-point Likert scale questions. The demographic questions were duplicated from a similar study with permission of the researcher, Major Lori Trego, yielding a .95 reliability for demographics. A panel of experts reviewed the instrument to establish content validity. Tool reliability was assessed at 93% using a pilot test and split-half reliability analysis using final sample data. (Appendix B)

### Assumptions:

1. Exercise is good for the human body
2. Soldiers want to do well on the APFT
3. APFT is an accurate measurement of physical strength and endurance
4. APFT is an accurate indicator of general fitness
5. Army retains soldiers who pass the APFT
6. Healthcare providers caring for pregnant and postpartum women want to promote wellness
7. Returning to pre-pregnancy fitness level is difficult immediately after pregnancy.

### Limitations:

1. The sample involved exclusively present or former active duty soldiers in the Army, therefore the results are not generalizable to the public.
2. A volunteer sample may result in bias. For example, those soldiers more diligent about fitness in general before and after pregnancy may be apt to volunteer.
3. Extraneous factors such as work and multiple children may add stress to the woman's life preventing her from exercising or not exercising to her full potential.

### Procedure:

The principal investigator personally advertised the study several times. She asked the women as they arrived the clinics at Dewitt Community Hospital and Kimbrough Ambulatory Care Clinic if they had time and were interested in completing a questionnaire, describing the purpose and confidentiality of the study. Questionnaires were also left with primary care providers at both facilities. The providers asked patients

if they were interested in filling out the surveys while waiting for their appointment or procedures. Occasionally staff members were interested, asked to fill out a survey, returning it to the point of contact at the facility.

### Data Analysis

The first research question, “What effect does pregnancy have on physical fitness levels as demonstrated by APFT scores?” was analyzed through descriptives of demographics, exercise, and fitness data. The effects of the weight gain during pregnancy was analyzed using Pearson correlation and Multiple Regression. T-tests were used to test the effects of pregnancy exercise programs, bedrest, complications, type of delivery, and the ability to exercise after pregnancy. The second research question, “How long does it take the postpartum soldier to return to pre-pregnancy fitness condition as measured by six month and one year postpartum APFT scores?” was analyzed through descriptives of pre-pregnancy APFT score, first postpartum APFT score, and second postpartum APFT score. Frequencies were utilized to assess both postpartum scores for ability to return to the pregnancy score for each individual. The third question, “How long do postpartum soldiers think it will take to perform as they previously did on the APFT?” was analyzed using content analysis of the qualitative data, t-tests, and descriptives of how long it takes to recover for them and how long they should be granted prior to taking the first postpartum APFT. Descriptive statistics were used to analyze the six Likert scale questions on exercise. Dichotomous questions were analyzed with T test. The narrative questions were analyzed using content analysis to identify common themes among respondents.

## Human Subjects and IRB

Walter Reed Army Medical Center IRB guidelines were followed. Participants were invited to be in this research study when waiting for an appointment at Kimbrough Ambulatory Care Center and Dewitt Community Hospital. The principal investigator personally invited them. A cover letter accompanied each questionnaire stating the name of the primary investigator and explaining the content, purpose, and intended use of the data. (Appendix A) The cover letter explained that the individual was under no obligation to participate in the study nor would there be any personal or professional repercussions should the individual choose not to participate. Additionally, the letter explained that there were no expected risks or discomforts from being in this study, that their participation was entirely voluntary. Methods to ensure patient privacy and confidentiality were outlined as well. Within the cover letter and at the beginning of the questionnaire, the letter stated that by completing the questionnaire and returning it to the researcher to be used in the study, the participant was implying informed consent to participate in the study. Refusal to participate would not result in any penalty or loss of benefits to which they are otherwise entitled. A subject could have changed her mind at any time and refused to complete the questionnaire. No names or identification numbers were printed on the questionnaire in order to ensure anonymity.

## CHAPTER FOUR

### Results

#### *Sample*

Of the fifty-two recruits, 54% were officers and 46 % were enlisted. (Table 1)

The participants ranged in age from 21 to 42 years with a mean age of 32 years. Eighty percent of the participants were married. It was a first time pregnancy for 31% of the soldiers, a second or third with 56% of the sample. (Table 5) It was a third or fourth time pregnancy for less than 14% of the participants. It was a first time birth for 48% of the women, and a second or third time birth for 48%. The other 4% were discussing the birth of their fourth or fifth child on the questionnaire. The number of children given birth to correlated with the number of living children. The number of living children equaled the number of children living at home, except for six participants who stated that either the father had custody of the child, or that there were stepchildren living in the home.

Weight gain during pregnancy ranged from 15 to 80 pounds with a mean of 40.8 pounds. Eighty-two percent had no history of preterm labor, and 72% had never miscarried.

Twenty-one percent were put on bedrest for preterm labor, pregnancy induced hypertension, preeclampsia, deep vein thrombosis, premature contractions, or intrauterine growth retardation. (Table 2) Seventy-three percent had a vaginal delivery. Forty-eight percent had complications with their births such as hemorrhage, breech presentation, fetal distress, low forceps delivery, pregnancy induced hypertension, preeclampsia, nuchal cord, oligohydramnios, hyperemesis, anemia, and gestational diabetes.

### *Research Questions*

The first research question addressed the effects of pregnancy on physical fitness levels as demonstrated by APFT scores. Research variables studied were weight gain, complications, bedrest, pregnancy exercise program, ability to exercise postpartum, type of delivery, exercise beliefs and practices. The effects of complications, bedrest, a formal exercise pregnancy program, and the ability to exercise postpartum were analyzed via t-test. Complications during pregnancy ( $p=.004$ ), ability to exercise during the postpartum period ( $p=.010$ ), and weight gain ( $p=.014$ ) were demonstrated to be statistically significant. The effects of bedrest ( $p=.145$ ), type of delivery ( $p=.423$ ), and participation in a pregnancy exercise program ( $p=.400$ ) were found to be statistically not significant. However the vaginal delivery postpartum scores were ten points higher than c-section delivery scores. The effects of exercise practices before and during pregnancy proved to be statistically not significant. (Table 2)

By using descriptive statistics it was discovered that 94% of the soldiers believed that exercise is important. (Table 4) Eighty-one percent believed that exercise is good for them when they are not pregnant. Ninety-two percent exercised either daily or weekly prior to the pregnancy, and 63% exercised during the pregnancy. Seventy percent were able to exercise daily or weekly after the pregnancy. Eighty-nine percent of the participants passed the APFT prior to the pregnancy. Twenty-three percent were involved in a formal pregnancy exercise program. The pre-pregnancy APFT scores ranged from 180 to 300 with a mean of 257. The first APFT score after pregnancy ranged from 163 to 300 with a mean score of 224, taken at an average time of 6 months

postpartum. The second APFT after pregnancy range from 179 to 300 with a mean of 241, taken at an average of 11 months postpartum. (Figure 1)

The second research question addressed the length of time it takes the postpartum soldier to return to pre-pregnancy fitness condition as measured by six month and one year postpartum APFT scores. There was a mean 40 point decrease in the pre-pregnancy and first postpartum APFT scores for the first postpartum APFT ( $p=.000$ ), with a 23-56 range of decrease. (Figure 1) There was an 18 point average decrease in the pre-pregnancy and second APFT scores ( $p=.000$ ). All participants had passed the APFT prior to conception. There were three failures on the first postpartum APFT, and one failure on the second. The percentage of women able to score equal or better on the first postpartum APFT compared to the pre-pregnancy APFT was 19%. The percentage of women able to do so on the second APFT was 31%, according to frequency statistics.

The third research question addressed the soldier's personal perceptions, asking them to state how long they thought it took or would take them to return to their pre-pregnancy physical condition. The answers ranged from two to twenty-four months with a mean of eleven months. Seventeen percent believed that six months is enough time to return to pre-pregnancy physical condition. Those that believed 6 months is enough time to recover scored higher than those that did not ( $p=.106$ ). Two non-open ended questions received several comments. The first one asked the volunteers if they believed 6 months was enough time to return to their pre-pregnancy fitness condition. Overall, it was believed that it was enough time to pass the APFT, however, it was not enough time to perform as they previously did before the pregnancy or to return to pre-pregnancy weight. Many stated that the ability to return to pre-pregnancy condition was dependant upon the

person and the individual pregnancy. They wrote that it depends on the person and their medical condition, baseline physical condition, weight gain, bedrest, complications, newborn baby, work environment, surgery, and family support. One woman stated that she had three pregnancies and each one was very different. She suggested that the APFT standards be modified to each pregnancy. Several stated that “it took 9 months to grow, it should take 9 months to size down and return to baseline condition.” When asked how long it would take to return to pregnancy condition, many stated they have not yet returned and may never return. A consensus of a year was stated, but many commented only with consistent and vigorous workouts. One woman said she still maxed the APFT after the birth of her first child, but the “run felt different and I lost many sit-ups and push-ups”. Many believe that it’s possible, but only with the support of their command and families. Three new mothers stated that they injured themselves during their first postpartum APFT.

The one open ended question asked the volunteers to list what prevented them from working out after the pregnancy. Generally, most women thought it was overwhelming to balance work, childcare issues, and a new baby. What little time was left in the day was filled with tending to other children, managing the home, or overwhelming fatigue. Some women commented that medical conditions prevented them from working out. The conditions listed were postpartum thyroiditis, hypertension, hemorrhoids, mastitis, and postpartum surgery. Large breasts and breastfeeding were concerns as well, with many reporting they found it difficult and painful to run with full breasts.



## CHAPTER FIVE

### Discussion/Recommendations

The subject of pregnancy and the APFT is a sensitive subject to many postpartum soldiers. There were numerous passionate comments on the surveys. It was hypothesized that excess weight gain, complications, bedrest, lack of exercise during and after pregnancy, c-section delivery, and belief that exercise is not important would all negatively impact postpartum APFT scores. To discover that the more weight gained during pregnancy, the lower the postpartum APFT score, supported this hypothesis. For every ten pounds gained, the APFT score decreased 6.8 points. The average weight gain was forty pounds, which could result in a 27 point decrease. For those women who struggle to pass the APFT prior to pregnancy, it could have a profound effect on their ability to pass postpartum. The effects of complications on the APFT scores were also found to be statistically significant. Several complications during pregnancy, the delivery, and postpartum were listed. Those women with complications are given the same six-month profile as those without complications. It was not surprising to find that the women able to exercise after the birth of their child scored higher than those unable to exercise. There is an abundance of information to support this result.

Finding the type of delivery as statistically not significant was surprising, however those with a vaginal delivery scored higher than those with a c-section. It is concerning that regardless of the type of delivery, all postpartum soldiers are given 6 months prior to the first record APFT. Finding bedrest as statistically not significant may be due to a small number of participants being placed on bedrest, and the inability to control for other variables such as medical conditions, family support, or baseline physical condition. Those that enrolled in a pregnancy exercise program scoring lower

than those that did not was surprising, however it did not account for the small percentage and reasons they enrolled. The literature is saturated with data supporting exercise during and after pregnancy to help return to pre-pregnancy fitness condition, and the small percentage of soldiers enrolled makes it difficult to compare the two groups. It was also surprising to find that exercise beliefs and practices were statistically not significant. Perhaps since the soldiers are part of an environment where exercise is part of their careers, all participants believed that exercise is important and exercise frequently.

Several recommendations have evolved from the results of this study. Assessing each pregnancy individually for the pregnancy profile should be considered. The effects of excess weight gain, complications, bedrest, surgery, and barriers to exercising should be addressed for each patient.

The Pregnancy/Postpartum Physical Training (PPPT) should be implemented around the world. It is an innovative physical fitness and health education program designed to assist pregnant and postpartum soldiers in meeting the unique needs associated with physical fitness during pregnancy and postpartum. The program provides the commander with a model for a standardized and safe PT program for pregnant and postpartum soldiers while providing consistent education to the soldiers. Several women stated that they wished they were enrolled in PPPT. Not every facility has this program in place. Also, the barriers to exercise such as work schedule, day care issues, and command support are issues easily remedied. Command education and support are critical to helping the soldiers return to pre-pregnancy fitness condition.

The Army should offer a diagnostic APFT at six months to help the soldier determine their weaker events and record their current level of fitness, and to consider

extending the pregnancy profile to greater than 6 months. The “for record” weigh in for these postpartum soldiers should be at 12 months to allow for ample time to lose the weight that took ten months to gain.

Further research needs to be conducted in this area. The literature on this subject is limited to only one similar study discussed in the literature review. A larger study should be conducted, Army wide, with access to APFT score cards. The score-cards would help with the poor recall of exact scores with a few participants. The study should be longitudinal, following one pregnancy through the two postpartum APFTs.

### Implications

For the healthcare provider this information may be useful when counseling active duty soldiers when discussing family planning. Many participants in this study were either encouraged or discouraged from exercising during pregnancy. If told by their healthcare provider that literature states mild daily exercise helps them return to pre-pregnancy exercise condition faster, hence pre-pregnancy APFT scores, compliance may increase. Education on the amount of weight gained during pregnancy correlating to a decrease in APFT score may deter the patient from gaining so much weight. It is a passionate subject for these women, especially those who struggle to pass the APFT. The healthcare provider is there to encourage them, before, during, and after pregnancy. The providers can utilize this information to tell them that they are not alone in their struggles to lose the weight and return to pre-pregnancy fitness condition. The pregnancy profile is administered by healthcare provider to the patient and may one day be extended from the standard 6 months based on the individual needs, complications, concerns of each woman.

### Conclusions:

There were statistically significant differences between the pre-pregnancy and first post-pregnancy APFT scores. However, the gap narrowed by the time the second post-pregnancy APFT around 11 months, but was still statistically significant. Only 19 % were able to return to their pre-pregnancy APFT score at the first APFT. It increased to 31% by the time they took the second APFT. The participants recognized this and a majority stated that one year was the amount of time that they would need to return to pre-pregnancy fitness condition, thereby performing as they previously did before pregnancy. The significant differences in scores, and personal beliefs stated by the soldiers, may mean that the current pregnancy profile of 6 months is not enough time for the women to recover and perform as they previously did. The findings may also demonstrate that each person needs to be evaluated for a profile separately, and given an amount of time based on weight gain, bedrest, complications, medical condition, and surgery.

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## APPENDIX A

### *Cover letter to Effects of Pregnancy on the Army Physical Fitness Test questionnaire*

Dear Volunteer,

My name is Stacy Usher. I am a Nurse Practitioner student at the Uniformed Services University of the Health Sciences. I am on active duty. Recently I had a child and was then faced with taking the Army Physical Fitness Test six months after delivery. It was personally challenging for me to return to my prepregnancy physical condition. I am interested if you have had a similar experience. You are invited to complete this survey because you are an active duty Army soldier who is at greater than one year postpartum who normally takes the APFT and I am interested in learning about your experience. Your participation is entirely voluntary. Refusal to participate will not result in any penalty or loss of benefits to which you are otherwise entitled.

The purpose of the study is to determine the perceived amount of time it takes to return to pre-pregnancy physical fitness level after having a baby using a questionnaire asking APFT scores and exercise routines.

Only one study has been done on this subject showing that it sometimes it may take longer than six months to return to pre-pregnancy fitness level.

If you agree to be in this study, you will be asked to complete a questionnaire while waiting for your appointment. It should take 3-5 minutes to complete. It will include questions such as how often did you exercise before, during, and after pregnancy, your APFT score before pregnancy, and APFT scores after pregnancy. These answers will help us discover how long it may take women to return to pre-pregnancy fitness levels following delivery of their babies. Please do not put your name or any other identifying information on the survey.

There will be up to 50 women taking part in this study.

There are no expected risks or discomforts from being in this study. Feel free to leave any questions blank if you wish. You will not be able to be identified in this study.

You will not benefit from being in this study. However, the data will be offered to the Army and for further research on pregnancy and the APFT. It will help us understand the effects of pregnancy on exercise fitness level and APFT scores.

Please feel free to ask any questions that will allow you to clearly understand this study to CPT Stacy Usher at 301-996-8490.

Thank you for your time,

CPT Stacy E. Usher, AN, USA

## APPENDIX B

### Effects of pregnancy on the Army Physical Fitness Test questionnaire

#### Pregnancy and the APFT Questionnaire

We are interested in learning about the effects of pregnancy on the APFT score in Active Duty Army females. Results of this survey will be used to understand special issues surrounding exercise, pregnancy, and the APFT and to enlighten patients, healthcare providers, and the Army of the results. No effort will be made to identify the responses of individual study participants; your privacy will be respected absolutely. Participation in this study is voluntary. By completing and returning this survey, you are implying informed consent for participation in this research study.

#### **Demographic Information**

##### Information about you

How old are you? \_\_\_\_\_

What is your rank \_\_\_\_\_

Circle the number that best describes your current marital status

1. Single
2. Married
3. Living together
4. Separated
5. Divorced
6. Widowed

How many times have you been pregnant? \_\_\_\_\_

How many times have you had premature labor (prior to 36 weeks of pregnancy)?  
\_\_\_\_\_

How many times have you had a miscarriage? \_\_\_\_\_

How many babies have you given birth to? \_\_\_\_\_

How many living children? \_\_\_\_\_

How many children living in your home? \_\_\_\_\_

Did you pass your last pre-pregnant APFT, including the HT/WT standard? (either with or without being taped) Circle one:

1. Yes
2. No

Please check the box that applies to you.

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Exercise is important to me.					
Exercising during pregnancy was good for me					
6 months is enough time to recover from pregnancy and take the APFT					

	Never	Seldom < 3 x month	Sometimes > 3 x month	Weekly	Daily
How often did you exercise pre-pregnancy?					
How often did you exercise during pregnancy?					
How often did you exercise after pregnancy?					

*Please circle the answer that applies to your most recent pregnancy.*

- Were you involved in a pregnancy exercise program?  
a. Yes      b. No
- To the best of your knowledge, what was your pre-pregnancy APFT score?  
\_\_\_\_\_
- How soon after your pregnancy was your first APFT? \_\_\_\_\_
- What was your first post pregnancy APFT score? \_\_\_\_\_
- What was your second APFT score? \_\_\_\_\_
- How soon after your pregnancy was your second APFT? \_\_\_\_\_
- Do you think 6 months is enough time to return to your pre-pregnancy physical condition?  
a. Yes    b. No



- If not, how long is enough? \_\_\_\_\_
8. How much weight did you gain during this pregnancy? \_\_\_\_\_
9. Type of delivery for this pregnancy?      a. Vaginal      b. C-Section
10. Any complications during pregnancy or delivery?      a. Yes      b. No  
If yes, please describe  
\_\_\_\_\_
11. Were you put on bedrest for this pregnancy?      a. Yes      b. No  
If yes, for how long? \_\_\_\_\_
12. How many weeks pregnant were you at delivery? \_\_\_\_\_
13. Have you been able to get back to pre-pregnancy fitness level?  
a. Yes      b. No
14. How long do you think it would take to return to your prepregnancy condition?  
\_\_\_\_\_
15. Where you able to exercise after the pregnancy to get back to pre-pregnancy fitness level?  
a. Yes      b. No
16. Please list what prevented you from working out if you answered No to #15.  
\_\_\_\_\_

Figure 1 : Pre-pregnancy, post-pregnancy #1 and #2 APFT scores. High, low, and mean scores.

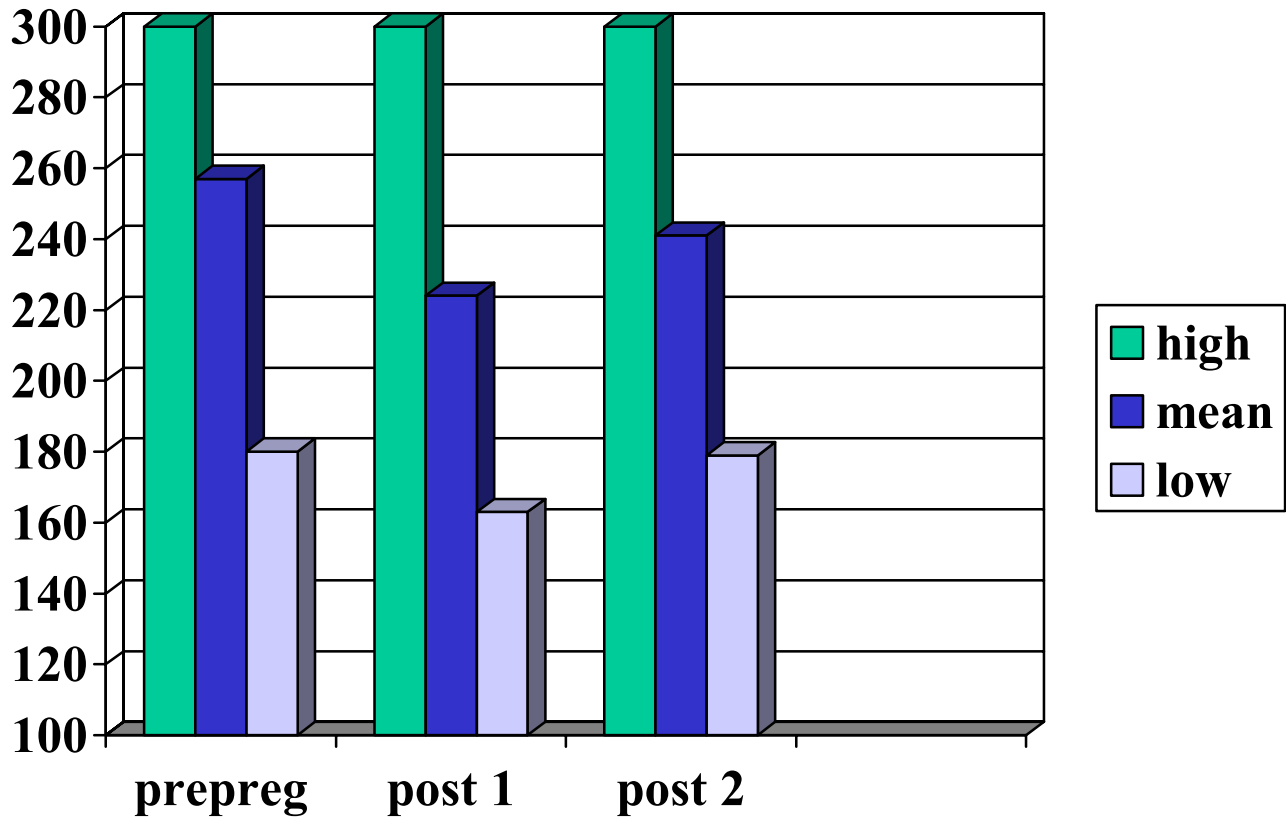


Table 1 : Demographic information

	Range	mean
age	21-42	32
Weight gain	15-80	40.2
Officer		54%
Enlisted		46%
Married		80%
Single		10%
Divorced		8%
Separated		2%

Table 2- Pregnancy variables and effect on APFT scores

	Percentage	Number	Mean	p value
Complications	48%	23	223	.004
No complications	52%	26	225	
Bedrest	21%	10	240	.145
No bedrest	79%	39	220	
Program	19%	9	214	.400
No program	81%	39	226	
Able to exercise	70%	35	230	.010
Not able to exercise	30%	14	210	
Vaginal delivery	73%	36	227	.423
C-section	27%	13	217	

Table 3- Exercise Beliefs

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Exercise is important	4%	0	2%	42%	52%
Exercise is good for me	0	12%	8%	42%	38%
6 months is long enough time to	23%	44%	10%	17%	6%

**Table 4- Exercise Frequency**

	Never (%)	Seldom (%)	Sometimes (%)	Weekly (%)	Daily (%)
Prepregnancy Exercise	0	4%	4%	44%	48%
During Pregnancy Exercise	8%	15%	14%	38%	25%
Postpregnancy Exercise	0	17%	17%	31%	38%

**Table 5- Pregnancy History**

	0	1	2	3	4	5
# pregnancies	NA	31%	25%	30%	6%	8%
# births	NA	48%	25%	23%	2%	2%
# preterm labor	32%	14%	4%	0	0	0
# miscarriages	73%	14%	9%	4%	0	0
# living kids	NA	48%	25%	23%	2%	2%
# kids living at home	2%	48%	27%	19%	0	4%